

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1-28.

The above amendment is responsive to points set forth in the Official Action.

In this regard, claim 1 has been amended by specifying therein that the linear or branched hydroxyl group containing polyester has a hydroxyl number of at least 15 mg KOH/g.

Claims 11 to 13 and 18 have been amended by deleting the preferred ranges.

These preferred ranges are now present in new claims 23 to 26, respectively.

New claim 27 is identical to claim 19 but now depends on claim 26.

New claim 28 is identical to new claim 22 but depends on claim 27.

The significance of the foregoing amendments will become further apparent from the remarks below.

Before proceeding further, a brief discussion of the present invention will be of assistance.

The invention as claimed in the present application refers to a thermosetting powder composition comprising:

- an amorphous isophthalic acid-rich polyester which is carboxyl-functional,
- a semi-crystalline polyester which is hydroxyl-functional,
- a curing agent system having functional groups reactive with the polyester carboxylic groups and the hydroxyl groups.

The composition according to the invention permits the obtention of coatings having an outstanding weatherability combined with excellent flow and flexibility.

Examples 16-30 show the combinations of the amorphous and semi-crystalline polyesters as prepared in Examples 1-14.

As can be seen from Table 1, Examples 16-24 relate to an embodiment as claimed in the present invention, namely the amorphous polyester is carboxyl-functional and the semi-crystalline polyester is hydroxyl-functional.

Comparative Examples 25 and 29 show a combination of amorphous carboxyl-functional polyester with semi-crystalline carboxyl-functional polyester.

Comparative Examples 26 and 28 relate to a combination of amorphous hydroxyl-functional polyester and semi-crystalline hydroxyl-functional polyester.

Comparative Example 30 relates to a combination of amorphous hydroxyl-functional polyester and semi-crystalline carboxyl-functional polyester.

From Table 2, which lists the paint performances of the powder paints, it is apparent that the embodiments according to the invention show better properties than the Comparative Examples 25, 26, 28-30. This is discussed in detail on page 24, line 22 - page 26, line 17 of the application as originally filed. Applicants have therefore shown that the thermosetting binder composition, as claimed in claim 1, has unexpected properties.

Claims 1-14 and 16-22 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over WO '745.

This rejection is respectfully traversed.

WO 91/14745 concerns a thermosetting powder composition comprising a blend of two different types of carboxyl group-containing polyesters and a cross-linking agent reactive with carboxyl groups. One type of polyester is amorphous and the other type of polyester is semi-crystalline (page 4, lines 4-15).

The semi-crystalline polyester is a carboxyl functional polyester (page 5, line 1) having an acid value of at least 10 mg KOH/g, preferably at least 28 mg KOH/g; it has a hydroxy value lower than 11 mg KOH/g, especially lower than 5 mg KOH/g (page 5, lines 22-28). A hydroxyl functional polyester which has an hydroxyl number of at least 15 mg KOH/g is not disclosed or suggested by WO '745.

The curing agent (crosslinking agent) that is used with the blend of semi-crystalline and amorphous polyesters is an organic compound that will react with the free carboxyl groups of the polyesters (page 11, lines 20-24). A curing agent which reacts with hydroxyl groups of the polyester is not disclosed in WO '745.

The amorphous polyester can be based on almost any polycarboxylic acid, amongst which is also cited isophthalic acid (page 11, lines 4-15).

The composition of amended claim 1 is novel over WO '745 because it contains a semi-crystalline polyester which is hydroxyl-functional having an hydroxyl number of at least 15 mg KOH/g and a curing agent having functional groups reactive with the polyester hydroxyl groups.

The present invention unobviously differs from WO '745 in that it contains a hydroxyl-function polyester and a curing agent having functional groups reactive with the polyester hydroxyl groups. In view of WO '745, the one skilled in the art would not arrive at the composition of present claim 1. Indeed, WO '745 teaches at page 11, lines 20 to 24 that the curing agent used with the blend of the semi-crystalline and amorphous carboxyl-functional polyesters has to react with the free carboxyl groups on the polyesters to provide a crosslinked polymer network. Hence, WO '745 teaches away from replacing one of the carboxyl-functional polyesters by an hydroxyl-functional polyester because such polyester would not react with the curing agent and no crosslinked polymer network would be formed.

The composition of amended claim 1 is therefore not obvious in view of WO '745.

Claims 1-5 and 7-22 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Chang alone or Chang in view of WO '745 taken further with WO '407.

This rejection is respectfully traversed.

With regard to the rejection over Chang alone, Chang concerns a thermosetting powder composition comprising an amorphous polyester, a crosslinking agent and a semi-crystalline polyester plasticizer. The plasticizer can be hydroxy-functional or carboxyl-functional depending on the crosslinker /resin combination to be used in the coating composition (column 3, lines 24-27). The plasticizer crosslinks into the matrix after it serves its role as plasticizer (column 4, lines 49-50).

The amorphous resin can be based on almost any dicarboxylic acid, amongst which is also cited isophthalic acid (column 5, lines 22-38). However, polyesters having at least 50 mole % of terephthalic acid are preferred (column 5, lines 47-49).

The crosslinking agent is either a crosslinker capable of reacting with carboxyl resins (column 3, lines 28-30) or a blocked isocyanate crosslinker capable of reacting with hydroxyl resins (column 3, lines 39-41).

Hence, Chang teaches to use combinations wherein both the amorphous resin and the plasticizer are carboxyl-functional or both the amorphous resin and the plasticizer are hydroxy-functional so that the plasticizer can be incorporated in the matrix after crosslinking.

Chang clearly does not suggest to use an isophthalic acid based amorphous resin which is carboxyl functional in combination with a semi-crystalline polyester which is hydroxyl functional and a curing system which has functional groups which react with carboxyl groups and functional groups which react with hydroxyl groups.

Hence, the composition of amended claim 1 is not obvious in view of Chang.

With regard to the rejection under 35 U.S.C. § 103(a) over U.S. 5,373,084 (Chang) in view of WO '745 taken further with WO 95/01407 (WO '407) as explained above, Chang only teaches combinations wherein both the amorphous polyester and the semi-crystalline plasticizer are carboxyl-functional or wherein both are hydroxyl-functional. The amorphous resins can be based on almost any possible diacid (column 5, lines 22-38), however resins comprising more than 50 % of terephthalic acid (column 5, line 48), especially those comprising only terephthalic acid are preferred (column 5, line 61).

WO 95/01407 relates to resins having superior weathering, impact and flexibility, more specifically to a thermosetting coating composition comprising an amorphous polyester composed of cyclohexane dicarboxylic acid and cycloaliphatic diols and a semi-crystalline polyester and a crosslinking agent. Generally covered are four embodiments (see page 4, lines 9-15):

- the amorphous polyester and the semi-crystalline polyester are both hydroxyl-functional;
- the amorphous and the semi-crystalline polyester are both carboxyl-functional;
- the amorphous polyester is hydroxyl-functional and the semi-crystalline polyester is carboxyl-functional; and
- the amorphous polyester is carboxyl functional and the semi-crystalline polyester is hydroxyl-functional.

However, in this paragraph it is clearly stated (page 4, lines 1-9) that the first and second embodiments as described above, where both polyesters have the same functionality, are preferred.

WO '407 clearly teaches that in order to obtain excellent weatherability, aliphatic polyesters such as those derived from cyclohexane-dicarboxylic acid are preferred (page 2, lines 17-21). The addition of a semi-crystalline polyester improves the impact strength while maintaining the excellent QUV weathering properties of the aliphatic resins (page 3, lines 18-23).

Hence, if one skilled in the art wanted to improve the weatherability of the resins disclosed in Chang, he would substitute in Chang's compositions the terephthalic acid by an aliphatic dicarboxylic acid such as taught by WO '407. Hence, one skilled in the art would not arrive at the composition of claim 1 wherein the amorphous polyester is an isophthalic acid rich polyester.

Moreover, if one skilled in the art wanted to combine the teachings of Chang and WO '407, he would use the preferred compositions of WO '407, i.e. those combining a hydroxyl functional amorphous polyester with a hydroxyl-functional semi-crystalline polyester or a carboxyl-functional amorphous polyester with a carboxyl-functional semi-crystalline polyester. These combinations are different from the claimed one.

The Examiner further combines the teachings of WO '745 with WO '407 (page 3, second section of the Office Action).

As explained above, WO '745 only teaches combinations wherein the amorphous polyester and the semi-crystalline polyester are both carboxyl-functional. The amorphous polyester can be based on almost any polycarboxylic acid, amongst which is also cited isophthalic acid (page 11, lines 4-15). Hence, Chang and WO '745 contain almost the same teaching, that is combinations wherein both the amorphous polyester and the semi-crystalline polyester are carboxyl-functional.

As explained above and in the description at page 24, line 22 to page 26, line 17, the composition according to amended claim 1 gives unexpected properties not obtainable by the compositions wherein both the amorphous and the semi-crystalline polyesters are hydroxyl-functional or carboxyl-functional. These unexpected properties could not be foreseen by combining the teachings of Chang, WO '745 and WO '407. Hence, the composition according to amended claim 1 is not obvious in view of Chang in combination with WO '407 and WO '745.


For the foregoing reasons, it is apparent that the rejections on prior art are untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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